Electronic Data Collection Tools for Quality Improvement: Antibiotic Utilization Project

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ABSTRACT. The project goal is to provide data on patterns of broad-spectrum antibiotic use in a pediatric clinic by utilizing electronic data collection tools. This was carried out as a quality improvement project sponsored by a local health network and one of its affiliated pediatric clinics. Pharmacy data was available to show relative rates of broad-spectrum antibiotic use, but this data was not linked to diagnostic categories or to total patient visits. There was also a lack of data showing the influence of related clinical factors and of shared decision-making between parents and physicians. Data to elucidate these factors was obtained with handheld computers used by physicians and with a web survey tool was used by patients and staff.

BACKGROUND. Medical use of handheld computers is evolving. However, a current review identifies less than 100 articles about handheld computers in the current medical literature.[i] Although the electronic medical record (EMR) is considered by experts "a foundation for outpatient care process improvement"[ii], less than 5% of ambulatory care clinics have an EMR. This project demonstrates the successful implementation of handheld computers for clinical data collection without an EMR. It also introduced a web survey of parents to help direct patient education.

METHODS. A total of 702 patient encounters were tracked in a private pediatric clinic over a 2-week time interval. Forms were developed by the investigating physician to address eight key clinical issues regarding antibiotic use. Twelve participating physicians used four handheld computers in half-day intervals. Every patient seen was documented. Prescribing physicians entered data as they worked. Data was downloaded to a PC database and analyzed in spreadsheet form. A web survey tool was designed to assess perceived misconceptions about antibiotic use. It was posted on a commercially available secure web site. No personally identifiable information was retained. Voluntary participation was solicited by making a flier available to patients at the time of check-in, with an explanation of the survey, a URL to the survey site, and a password.

RESULTS. Data analysis identified high-impact areas for future antibiotic utilization review. By far the highest use of broad-spectrum antibiotics was in the group with otitis media that had failed previous treatment in children less than 3 years of age. Changes in this group would have a large impact Frequent reasons for broad-spectrum antibiotic use were multiple diagnoses and diagnostic uncertainty. There were significant misconceptions about streptococcal pharyngitis and other aspects of antibiotic use among the survey participants.

SYSTEM EVALUATION. Handheld data collection was accomplished successfully with very minimal training. The brief forms were tolerated as an addition to the workload for the participating physicians. There were a few records that were incomplete. There were no significant technical problems. Physicians rarely used the handheld devices for anything besides than data collection. Several software programs were loaded as incentives, but these were not significantly utilized. Users often left the handheld devices at the workstation while seeing their patients. The web survey tool for patient input is potentially valuable, but few parents participated. Instruction of parents was not well integrated into the workflow. A presentation of the results, summarizing the data analysis and using graphical displays, was made to the sponsoring health network and to the clinic. Recommendations were made regarding future investigation and guideline development.

CONCLUSION. Physicians and patients at the point of care can utilize electronic data collection tools to provide local, practice-specific quality improvement data. Antibiotic utilization patterns were identified which will direct progress toward more cost-effective antibiotic use.

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[i] Sandra Fischer, Thomas E. Stewart, Sangeeta Mehta, Randy Wax, Stephen Lapinsky **Handheld Computing in Medicine**, J. Am. Med. Inform. Assoc. 10:139-149.

[ii] www.hsph.harvard.edu/qcare/batesslides_files/frame.html